

NASA/SP—1999-7011/SUPPL491
May 17, 1999

AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY WITH INDEXES

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Typical Report Citation and Abstract

- ❶ 19970001126 NASA Langley Research Center, Hampton, VA USA
- ❷ **Water Tunnel Flow Visualization Study Through Poststall of 12 Novel Planform Shapes**
- ❸ Gatlin, Gregory M., NASA Langley Research Center, USA Neuhart, Dan H., Lockheed Engineering and Sciences Co., USA;
- ❹ Mar. 1996; 130p; In English
- ❺ Contract(s)/Grant(s): RTOP 505-68-70-04
- ❻ Report No(s): NASA-TM-4663; NAS 1.15:4663; L-17418; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche
- ❼ To determine the flow field characteristics of 12 planform geometries, a flow visualization investigation was conducted in the Langley 16- by 24-Inch Water Tunnel. Concepts studied included flat plate representations of diamond wings, twin bodies, double wings, cutout wing configurations, and serrated forebodies. The off-surface flow patterns were identified by injecting colored dyes from the model surface into the free-stream flow. These dyes generally were injected so that the localized vortical flow patterns were visualized. Photographs were obtained for angles of attack ranging from 10° to 50°, and all investigations were conducted at a test section speed of 0.25 ft per sec. Results from the investigation indicate that the formation of strong vortices on highly swept forebodies can improve poststall lift characteristics; however, the asymmetric bursting of these vortices could produce substantial control problems. A wing cutout was found to significantly alter the position of the forebody vortex on the wing by shifting the vortex inboard. Serrated forebodies were found to effectively generate multiple vortices over the configuration. Vortices from 65° swept forebody serrations tended to roll together, while vortices from 40° swept serrations were more effective in generating additional lift caused by their more independent nature.
- ❽ Author
- ❾ *Water Tunnel Tests; Flow Visualization; Flow Distribution; Free Flow; Planforms; Wing Profiles; Aerodynamic Configurations*

Key

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AEROSPACE MEDICINE AND BIOLOGY

A Continuing Bibliography (Suppl. 491)

MAY 17, 1999

52 AEROSPACE MEDICINE

Includes physiological factors; biological effects of radiation; and effects of weightlessness on man and animals.

19990028360 Toigo Associates, Inc., WoodBridge, VA USA

Health Technology Assessment Tool: Telemedicine, Phase 1, Re-Engineering Laboratory Final Report

Jul. 15, 1998; 343p; In English

Contract(s)/Grant(s): DAAB07-93-D-A263

Report No.(s): AD-A360194; CAAS-98-002; No Copyright; Avail: CASI; A15, Hardcopy; A03, Microfiche

The goal of this study is to design a prototype assessment tool for evaluating technologies relevant to Telemedicine. The assessment tool will be used to guide future investments and review and analyze current AMEDD projects in Telemedicine.

DTIC

Telemedicine; Medical Equipment

19990028377 Department of Energy, Office of Energy Research, Washington, DC USA

MCNP speed advances for boron neutron capture therapy

Goorley, J. T., Department of Energy, USA; McKinney, G., Department of Energy, USA; Adams, K., Department of Energy, USA; Estes, G., Department of Energy, USA; Apr. 30, 1998; 5p; In English; Radiation protection and shielding: technologies for the new century, USA

Report No.(s): DE98-004377; LA-UR-97-5135; No Copyright; Avail: Department of Energy Information Bridge, Microfiche

The Boron Neutron Capture Therapy (BNCT) treatment planning process of the Beth Israel Deaconess Medical Center-M.I.T team relies on MCNP to determine dose rates in the subject's head for various beam orientations. In this time consuming computational process, four or five potential beams are investigated. Of these, one or two final beams are selected and thoroughly evaluated. Recent advances greatly decreased the time needed to do these MCNP calculations. Two modifications to the new MCNP4B source code, lattice tally and tracking enhancements, reduced the wall-clock run times of a typical one million source neutrons run to one hour twenty five minutes on a 200 MHz Pentium Pro computer running Linux and using the GNU FORTRAN compiler. Previously these jobs used a special version of MCNP4AB created by Everett Redmond, which completed in two hours two minutes. In addition to this 30% speedup, the MCNP4B version was adapted for use with Parallel Virtual Machine (PVM) on personal computers running the Linux operating system. MCNP, using PVM, can be run on multiple computers simultaneously, offering a factor of speedup roughly the same as the number of computers used. With two 200 MHz Pentium Pro machines, the run time was reduced to forty five minutes, a 1.9 factor of improvement over the single Linux computer. While the time of a single run was greatly reduced, the advantages associated with PVM derive from using computational power not already used. Four possible beams, currently requiring four separate runs, could be run faster when each is individually run on a single machine under Windows NT, rather than using Linux and PVM to run one after another with each multiprocessed across four computers. It would be advantageous, however, to use PVM to distribute the final two beam orientations over four computers.

NTIS

Boron; Neutrons; Therapy; Capture Effect; Beams (Radiation)

19990028498 Texas Univ. Health Science Center, Houston, TX USA

Applications of Anabolic Vitamin D Analogs as Countermeasures to Bone Loss Final Report

Karin, Norman J., Texas Univ. Health Science Center, USA; Jun. 30, 1998; 3p; In English

Contract(s)/Grant(s): NCC9-36; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

The experiments in Round 2 were designed to extend the results of our efforts in Round 1 which led us to hypothesize that the seco-steroid, 1,25-dihydroxyvitamin D3[1,25(OH)2D3], acts in synergy with parathyroid hormone (PTH) to regulate bone calcium homeostasis. Our work centered on one particular target of 1,25(OH)2D3 action, the voltage-sensitive calcium channels

(VSCC's), which are activated acutely by this steroid within milliseconds of exposure . A second area of research focused on the effects of mechanical strain on VSCC expression in bone. These experiments were performed in collaboration with Dr. Steven Goldstein (Univ. Michigan), who generously provided RNA extracted from dog bones that had been exposed to mechanical strain in vivo. Our results suggest that mechanical loading elevated VSCC expression in the long bones from 3 of the 6 animals tested. A second line of experimentation, carried out in collaboration with Dr. Randall Duncan, a NASA-funded investigator in Indianapolis, centered on RT-PCR analysis of effects of mechanical strain on Ca2(+) channel expression in cultured bone cells. Compared to unstrained controls, the expression of vitamin-D-sensitive Ca2(+) channels is elevated 3- to 5-fold over a 24 hr period.

Derived from text

Bones; Countermeasures; Calcium; Calciferol; Calcium Metabolism; Biological Effects; Aerospace Medicine

19990028500 National Science and Technology Council, Committee on Environment and Natural Resources, Washington, DC USA

Endocrine Disruptors: Research Needs and Priorities, 1998

Dec. 1998; 50p; In English

Report No.(s): PB99-119257; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The document provides an analysis of the Inventory of Federally funded research on endocrine disrupting chemicals prepared by the Working Group. Federal agencies are currently funding several hundred research projects relating to endocrine disruption, and there is also a considerable amount of basic research funded by the Federal government on the biochemistry of hormones and their regulation and control of physiological processes. The Inventory indicates that the largest efforts are in human health research, which is clearly dominant over ecological and exposure research. Reproductive and developmental toxicity endpoints are receiving considerable attention in both human and ecological research, while carcinogenicity and neurotoxicity studies are well represented in human health, but not in ecological research. Few studies are underway in the area of immunotoxicity. On-going research also addresses only a limited number of organisms and agents. The non-human species most studied are laboratory mammals, with fish the most prevalent group in studies focused on species from the natural environment. PCBs, dioxins, and persistent pesticides are the most commonly studied chemical classes, with little attention being given to other chemicals, such as alkylphenols, phthalate esters, or nonpersistent pesticides.

NTIS

Endocrinology; Research Projects; Contaminants; Endocrine Systems

19990028602 Department of Energy, Office of Environmental Restoration and Waste Management, Washington, DC USA

Developing the Sandia National Laboratories transportation infrastructure for isotope products and wastes

Trennel, A. J., Department of Energy, USA; Nov. 30, 1997; 10p; In English; 12th; PATRAM '98: Packaging and Transportation of Radioactive Material, USA

Report No.(s): DE98-001386; SAND-97-0776C; No Copyright; Avail: Department of Energy Information Bridge, Microfiche

The US Department of Energy (DOE) plans to establish a medical isotope project that would ensure a reliable domestic supply of molybdenum-99 ((sup 99) Mo) and related medical isotopes (Iodine-125, Iodine-131, and Xenon-133). The Department's plan for production will modify the Annular Core Research Reactor (ACRR) and associated hot cell facility at Sandia National Laboratories (SNL) /New Mexico and the Chemistry and Metallurgy Research facility at Los Alamos National Laboratory (LANL). Transportation activities associated with such production is discussed.

NTIS

Standardization; Wastes; Radioactive Isotopes

19990031871 Institute of Space Medico-Engineering, Beijing, China

Space Medicine and Medical Engineering, Volume 11 *Hangtian Yixue yu Yixue Gongcheng*

Wei, Jin-He, Editor, Institute of Space Medico-Engineering, China; Aug. 1998; ISSN 1002-0837; 86p; In English; In Chinese Report No.(s): PB99-127805; Copyright Waived; Avail: CASI; A05, Hardcopy; A01, Microfiche

This journal issue includes articles discussing the following subjects: 1) Linear and nonlinear analysis of heart rate variability during lower body negative pressure; 2) Simulation study on +Gz protection afforded by extended coverage anti-G suits; 3) Mutation induced by space conditions in Escherichia coli strains; 4) Biological effect of space flight on edible fungi onboard recoverable scientific satellite; 5) Study on mechanisms of T Lymphocyte function changes in mice under simulated weightlessness in terms of IL-2 and Bel-2 Gene transcription; 6) Effects of simulated weightlessness and irradiation on metabolism of rat myocardial cells cultured in vitro; 7) Five year follow-up of contrast vision of normal eyes; 8) Study on temporal character of visual function and working efficiency; 9) Effect of noise on human mental rotation performance; 10) Changes in cerebral circulation function during head-down bed rest for 7 days; 11) Effects of task load level and input modality format on P(sub 3) wave of event related

brain potential; 12) Changes of T-SOD activity and MDA, GSH contents in blood of guinea pigs after exposure to narrow-band noise; and 13) Study on application of neural networks to hierarchical optimal control of large scale systems. Also included are brief reports on bone cytokines and compensating regulation in rats, physiological changes after parachuting in humans, and effects of tail suspension on mitochondrial Ca(+2), Mg(+2) and parameters of electron microscopic morphometry in rats skeletal muscle. Finally, a special article on Noninvasive evaluation of cardiovascular autonomic regulation and its application in physiological studies under weightlessness, a literature review and special news is presented.

CASI

Aerospace Medicine; Medical Science; Physiological Effects; Weightlessness; Gravitational Effects

19990031938 Defence Science and Technology Organisation, Aeronautical and Maritime Research Lab., Melbourne, Australia
A Methodology for Measuring the Physiological Strain of Enhanced Soldiers: The 1998 Soldier Combat System Enhancement Study

Amos, Denys; Cotter, James D.; Lai, Aai-Man; Forbes-Ewan, Christopher H.; Nov. 1998; 101p; In English

Report No.(s): AD-A360624; DSTO-TR-0747; DODA-AR-010-678; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche

The prime objective of the 1998 Soldier Combat System Enhancement Study was to assess, develop and verify methods to evaluate the physiological performance of dismounted soldiers with basic or enhanced capabilities conducting routine operations in the tropics. Core temperature, mean skin temperature and heart rate are appropriate measures for evaluating the physiological burden of soldier combat system enhancements. Current techniques for measuring mean skin temperature and heart rates are adequate. The measurement of core temperature using rectal thermistors has significant limitations, especially during vigorous activities. Studies of the hydration status of soldiers can be conducted using relatively straightforward methods to determine water intake, weight loss, urine production, and total sweat rate by weight differences. For field studies of hydration, there may be no need to analyze urine for sodium; specific gravity is more easily measured and appears to provide adequate information on hydration status. The robustness of the Metamax used for VO₂ measurements was demonstrated and provided real time measurements of oxygen consumption, and of metabolic stress associated with activities.

DTIC

Physiological Effects; Procedures; Body Temperature; Human Body; Skin Temperature (Biology); Temperature Measurement

19990032085 Norwegian Defence Research Establishment, Kjeller, Norway

Evaluation of Health Effects in Connection with a Change in Fuel Type from Diesel to F-34 *Vurdering av Helsemessige Konsekvenser ved Overgang Fra Autodiesel Til Forsvarets Flydrivstoff (F-34)*

Arnt, Johnsen, Norwegian Defence Research Establishment, Norway; Tornes, John Aa, Norwegian Defence Research Establishment, Norway; Nov. 18, 1998; 64p; In Norwegian

Contract(s)/Grant(s): Proj. FFITOX/Oppdr-297001/138.

Report No.(s): FFI/RAPPORT-98/05899; ISBN 82-464-0309-5; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

The consequences to human health and to the ecosystem connected with the substitution of diesel with F-34 jet fuel on ground vehicles have been evaluated. There are no indications that such a change will cause any enhanced health hazard or environmental hazard.

Author

Jet Engine Fuels; Health; Hazards

19990032206 NASA Langley Research Center, Hampton, VA USA

Aerospace Medicine and Biology: A Continuing Bibliography with Indexes, Supplement 489

Apr. 19, 1999; 56p; In English

Report No.(s): NASA/SP-1999-7011/SUPPL489; NAS 1.21:7011/SUPPL489; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

This supplemental issue of Aerospace Medicine and Biology, A Continuing Bibliography with Indexes (NASA/SP-1999-7011) lists reports, articles, and other documents recently announced in the NASA STI Database. In its subject coverage, Aerospace Medicine and Biology concentrates on the biological, physiological, psychological, and environmental effects to which humans are subjected during and following simulated or actual flight in the Earth's atmosphere or in interplanetary space. References describing similar effects on biological organisms of lower order are also included. Such related topics as sanitary problems, pharmacology, toxicology, safety and survival, life support systems, exobiology, and personnel factors receive appropriate attention. Applied research receives the most emphasis, but references to fundamental studies and theoretical prin-

ciples related to experimental development also qualify for inclusion. Each entry in the publication consists of a standard bibliographic citation accompanied, in most cases, by an abstract.

CASI

Aerospace Medicine; Bibliographies; Exobiology; Indexes (Documentation)

19990032593 Baylor Coll. of Medicine, Houston, TX USA

Artificial Gravity as a Countermeasure of Cardiovascular Deconditioning in Spinal Cord Injury *Final Report*

Cardus, David, Baylor Coll. of Medicine, USA; February 1999; 14p; In English

Contract(s)/Grant(s): NCC9-36; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

An essential item in the development of this project was the availability of the artificial gravity simulator (AGS). At the termination of that grant in 1994, the AGS was dismantled and transferred to NASA Johnson Space Center. It took over two years for the AGS to be re-assembled and re-certified for use. As a consequence of the non-availability of the AGS for two years, there was a considerable delay in implementing the various phases of the project. The subjects involved in the study were eight healthy able bodied subjects and twelve with spinal cord injury. After analysis of the data collected on these subjects, six of the healthy able bodied subjects and three of the subjects with spinal cord injury were found to qualify for the study. This report gives the results of four subjects only, two healthy able bodied and two spinal cord injured subjects because the period of the grant (1 year) and its extension (1 year) expired before additional subjects could be studied. The principal objective of the study was to conduct a series of experiments to demonstrate the feasibility of utilizing artificial gravity to assist in the physical rehabilitation of persons with spinal cord injuries.

Author

Artificial Gravity; Injuries; Spinal Cord; Cardiovascular System; Hemodynamic Responses; Physiological Responses

53

BEHAVIORAL SCIENCES

Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

19990032553 Department of Energy, Washington, DC USA

Different understanding: science through the eyes of visual thinkers

Sesko, S. C., Department of Energy, USA; Marchant, M., Department of Energy, USA; Sep. 11, 1997; 27p; In English, USA; Meeting sponsored in part by American Inst. for Graphic Arts

Report No.(s): DE98-052267; UCRL-JC-128489; CONF-9711118; No Copyright; Avail: Department of Energy Information Bridge, Microfiche

The objective of this emergent study was to follow the cognitive and creative processes demonstrated by five art student participants as they integrated a developing knowledge of big science, as practiced at the Department of Energy's Lawrence Livermore National Laboratory, into a personal and idiosyncratic visual, graphical, or multimedia product. The non-scientist participants involved in this process attended design classes sponsored by the Laboratory at the Art Center College of Design in California. The learning experience itself, and how the students arrived at their product, were the focus of the class and the research. We believe that this study contributes to the literature on science education, art education, cognitive change, and public understanding of science.

NTIS

Education; Cognition; Human Behavior; Creativity

54

MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering; biotechnology; and space suits and protective clothing. For related information see also 16 Space Transportation.

19990028369 Department of Energy, Office of Financial Management and Controller, Washington, DC USA

In-vehicle human factors for integrated multi-function systems: Making ITS user-friendly

Spelt, P. F., Department of Energy, USA; Scott, S., Department of Energy, USA; Apr. 30, 1998; 13p; In English; Sponsored by Interactive Telemedical Systems, USA

Report No.(s): DE98-005664; ORNL/CP-98317; CONF-980563; No Copyright; Avail: Department of Energy Information Bridge, Microfiche

As more and more Intelligent Transportation System in-vehicle equipment enters the general consumer market, the authors are about to find out how different design engineers are from ordinary drivers. Driver information systems are being developed and installed in vehicles at an ever-increasing rate. These systems provide information on diverse topics of concern and convenience to the driver, such as routing and navigation, emergency and collision warnings, and a variety of motorists services, or yellow pages functions. Most of these systems are being developed and installed in isolation from each other, with separate means of gathering the information and of displaying it to the driver. The current lack of coordination among on-board systems threatens to create a situation in which different messages on separate displays will be competing with each other for the drivers attention. Urgent messages may go unnoticed, and the number of messages may distract the driver from the most critical task of controlling the vehicle. Thus, without good human factors design and engineering for integrating multiple systems in the vehicle, consumers may find ITS systems confusing and frustrating to use. The current state of the art in human factors research and design for in-vehicle systems has a number of fundamental gaps. Some of these gaps were identified during the Intelligent Vehicle Initiative Human Factors Technology Workshop, sponsored by the US Department of Transportation, in Troy, Michigan, December 10--11, 1997. One task for workshop participants was to identify needed research areas or topics relating to in-vehicle human factors. The top ten unmet research needs from this workshop are presented. Many of these gaps in human factors research knowledge indicate the need for standardization in the functioning of interfaces for safety-related devices such as collision avoidance systems (CAS) and adaptive cruise controls (ACC). Such standards and guidelines will serve to make the safety-critical aspects of these systems consistent across different manufacturers, thereby reducing the likelihood of driver surprise. A second area to emerge from the Workshop concerns research into techniques for integrating multiple devices in vehicles.

NTIS

Human Factors Engineering; Transportation; Collision Avoidance; Adaptive Control

19990028443 Defence Science and Technology Organisation, Aeronautical and Maritime Research Lab., Melbourne, Australia
The Resistance to Thermal and Moisture Transmission and Durability of Candidate Rainwear Fabrics

Egglesstone, G. T.; Oct. 1998; 21p; In English

Report No.(s): AD-A360601; DSTO-TR-0733; DODA-AR-010-656; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The current in-service raincoat used by the Army is considered unsuitable for operations in northern Australia due to its lack of 'breathability'. Breathability in a raincoat is directly related to the ability of the fabric to transport heat and moisture vapor at a rate that will keep the body in a state of thermal equilibrium under operational conditions. Five candidate fabrics were tested for their durability and resistance to the transport of heat and moisture vapor. The waterproof component of two of the fabrics was a coating while the other three were waterproofed using semi-permeable membranes. From a comfort viewpoint the worst fabric was that currently used in the in-service raincoat.

DTIC

Protective Clothing; Synthetic Fibers; Waterproofing; Heat Transfer; Moisture Resistance

19990032524 Department of Energy, Assistant Secretary for Fossil Energy, Washington, DC USA

Task 8.6--Advanced Man Machine Interface (MMI)

Dec. 31, 1997; 13p; In English

Report No.(s): DE98-002021; DOE/MC/30246-5813; No Copyright; Avail: Department of Energy Information Bridge, Microfiche

The Solar/DOE ATS engine program seeks to improve the utilization of turbomachinery resources through the development of an Advanced Man Machine Interface (MMI). The program goals include timely and succinct feedback to the operations personnel to enhance their decision making process. As part of the Solar ATS Phase 2 technology development program, enabling technologies, including graphics environments, communications technology, and operating systems were explored to determine their viability to support the overall MMI requirements. This report discusses the research and prototyping effort, as well as the conclusions reached.

NTIS

Human-Computer Interface; Gas Turbines; ATS; Research and Development; Gas Turbine Engines

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